

PCT/DE00/02362

A-99 015 PCT

CLAIMS

Sub 17
C1

1. A vacuum holding device (1) with apparatus for producing a vacuum, wherein

- the vacuum holding device (1) and the apparatus for producing a vacuum are constructed in two parts and can be detached and connected substantially gastight by positioning,

wherein the vacuum holding device has:

- a vacuum chamber (5) which is open in the direction of a contact surface (14),
- an opening as the end of a connection from the vacuum chamber to the external environment (7),
- a valve (9) which ensures gastight closing and opening of the connection between the vacuum chamber (5) and the external environment (7),
- means for producing a detachable substantially gastight coupling between the outwardly directed opening and a device to produce a vacuum.

characterised in that

- the vacuum holding device (1) has a seal (15) which seals the vacuum chamber gastight against the contact surface (14) towards the outside,

and the apparatus for producing a vacuum has

- a piston suction pipe (13) which has openings at the beginning (24) and at the end of the suction path (26).

AMENDED PAGE

2. The vacuum holding device (1) according to Claim 1, characterised in that the valve (9) is constructed as substantially conical, spherical or hemispherical.
3. The vacuum holding device (1) according to one of the preceding claims, characterised in that the connection between the vacuum chamber (5) and the external environment has a conical, spherical or hemispherical bearing surface (8) to accommodate the valve (9).
4. The vacuum holding device (1) according to one of the preceding claims, characterised in that, at least in the regions in contact with the bearing surface (8), the valve (9) consists of a rubber elastic material.
5. The vacuum holding device (1) according to one of the preceding claims, characterised in that one part of the means for producing a detachable, substantially gastight coupling from the upwardly directed opening is a surface.
6. The vacuum holding device (1) according to one of the preceding claims, characterised in that the detachable, substantially gastight coupling is formed by a rubber seal between the surface and attachment of the device to produce a vacuum.
7. The vacuum holding device (1) according to one of the preceding claims, characterised in that the surface (12) for attaching the device to produce a vacuum is directed parallel to the contact surface (14) of the vacuum holding device (1).
8. The vacuum holding device (1) according to one of the preceding claims, characterised in that the vacuum holding device (1) has a holding receptacle for the equipment holder.

A2 9. A method for securing the vacuum holding device (1) by means of an apparatus for producing a vacuum according to one of the preceding claims to a contact surface (14), characterised by the following steps:

- positioning the vacuum holding device (1) on a contact surface (14),
- producing a detachable, substantially gastight coupling between the outwardly directed opening of the vacuum holding device (1) and the piston suction pipe (13),
- producing a vacuum in the vacuum chamber (5) by withdrawing the suction piston (28) from the piston suction pipe (13) until the suction piston (28) passes an upper opening (26) and
- removing the apparatus for producing a vacuum.

SUBS 10. A vacuum holding device (1), wherein the vacuum holding device has:

- a vacuum chamber (5) which is open in the direction of the contact surface (14),
- an opening as the end of a connection between the vacuum chamber and the external environment (7),
- a valve (9) which ensures gastight closing and opening of the connection between the vacuum chamber (5) and the external environment (7) and
- means for producing a detachable substantially gastight coupling between the outwardly directed opening and an apparatus for producing a vacuum,
- the valve (9) is constructed as substantially conical, spherical or hemispherical and
- the connection between the vacuum chamber (5) and the external environment has a conical, spherical or hemispherical bearing surface (8) to accommodate the valve (9),

characterised in that

- the vacuum holding device has a seal (15) which closes the vacuum chamber gastight towards the outside against the contact surface (14) and
- the valve (9) extends downwards as a strip or rod.

11. The vacuum holding device (1) according to Claim 10, characterised that at the end of the strip or rod there is at least one support, preferably in the form of at least one pin or wedge.

SUBA3 12. The vacuum holding device (1) according to Claim 10 or 11, characterised in that the strip or rod-shaped extension of the valve (9) is elastic in order to hold the valve in the bearing surface.

13. The vacuum holding device (1) according to one of Claims 10 to 12, characterised in that the seal (15) is a flat seal made of elastic material.

14. The vacuum holding device (1) according to one of Claims 1 to 8, characterised in that the seal (15) is a flat seal made of an elastic material.

SK